Section 11 Drinking Water Supplies Development and Management

Tables

11 Drinking Water Supplies Development and Management

Adequate water for culinary use is required for the area's rapidly growing population. If growth is to continue, additional high quality water supplies will be required.

11.1 Introduction

This section discusses systems providing water for human consumption in the Kanab Creek/Virgin River Basin. Even though public and private water suppliers provide water for other uses, the primary purpose is for the benefit of people.

Public water supply systems are addressed whether they are publicly or privately owned. A public water supply system is one serving at least 15 connections or 25 people 60 days per year.

11.2 Setting

Until recent years, the water supply for public systems came from groundwater (wells and springs). Surface water is now being used more extensively as the population increases, especially in the St. George area where a new 10 mgd water treatment plant was constructed in 1989.

Culinary use (sometimes called municipal and industrial), refers to the water primarily used in homes, businesses and industry. It also includes the water used to irrigate lawns and gardens. (See Section 5.4 for definition).

Because the area does not have a heavy industrial base, population is the main factor controlling culinary water demand. Daily water use per capita (GPCD) can vary substantially depending on how much culinary water is used to irrigate lawns and gardens.

The state of Utah began a cooperative effort in 1977 with the U.S. Geological Survey to quantify water use data from public water suppliers and major self-supplied industries. The data are collected by the Utah Division of Water Rights through questionnaires mailed each year to public water suppliers. The data for 1979 through 1989 are summarized in published reports.[4] The 1990-92 data have not been published.

The current basinwide average culinary water use per capita day (GPCD) is about 350 gallons, which is higher than the state average of 284 gallons. The GPCD use ranges from 147 in Virgin and 152 in

Glendale to 389 in Washington (See Table 5-8).

Much of the variability between cities can be attributed to the amount of culinary water used for outside irrigation. This is partly because of the difference in lifestyle between rural agricultural areas such as Glendale and retirement communities such as St. George. Another major factor for the variability in per capita use is the large number of tourists and part-time residents in the St. George area who use water, but are not included in the census population. A mean annual July temperature variation of nearly 20°F. from the cooler to hotter areas also affects water use.

11.3 Policy Issues and Recommendations

Drinking water supplies are most important to the health and welfare of the local population. Issues and recommendations concerning drinking water are discussed below.

11.3.1 Drinking Water Quality

Issue - Drinking water quality needs to be continually monitored to assure a safe supply.

Discussion - Public water systems are managed to provide a safe, dependable supply to its users. The smaller private systems are more at risk because they lack staff to operate and maintain them. Some work has been started by the Five-County Association of Governments to help the smaller systems obtain adequate technical assistance. As more surface water is used, these problems will tend to increase.

Recommendation - State and local health authorities should review their monitoring programs and procedures to assure ample oversight - including monitoring, education and public awareness - is given to drinking water supplies.

11.3.2 Drinking Water Quantity

Issue - The high rate of population growth will increase the demand for municipal and industrial water.

Discussion - Because of the favorable climate in most of the basin, increasing numbers of people are moving into the area. A large increase in visitor-days of recreationists coming into the area also has been noted. These factors will increase the need for more high quality water than now exists. Even treatable lower quality water, including supplies converted from agricultural use, will become more scarce. Conservation of agricultural, municipal and industrial water can postpone the need in some locations.

Recommendation - Water suppliers need to project future demands and make plans to fill the potential needs by protecting and utilizing aquifer recharge areas, by developing more supplies and by implementing conservation.

11.4 Local Regulatory Organizations

All public drinking water supplies are subject to the Utah Safe Drinking Water Act and the Utah Public Drinking Water Regulations. These laws and regulations are administered by the State Department of Environmental Quality, Division of Drinking Water. The department has a district engineer stationed in St. George.

Towns, cities and counties have primary responsibilities for drinking water control within their respective entities. These responsibilities and authorities are contained in Sections 10, 11, 17, 19, and 73 of the *Utah Code Annotated, 1953, amended.* Private water suppliers (i.e. those serving fewer than 15 conections or 25 people) are not regulated.

In addition, the Board of Health, Southwest Utah Public Health Department, has responsibilities for controlling drinking

water and individual water well installation and construction. These responsibilities and duties are carried out through their staff. They work closely with the Utah Department of Environmental Quality on related regulations.

When private water systems are proposed to serve new developments, local planning commissions often ask the local health department to evaluate the feasibility of the water supply. Specific design and construction standards for these private systems are not assured once planning commission approval is received.

11.5 Drinking Water Problems

Increasing population will increase the demand for high quality water and the potential for contamination of drinking water supplies. Of the 78 drinking water systems in the basin, 35 are classified "Public Community" systems. Official ratings of public community water systems by the Division of Drinking Water are summarized in Table 11-1.

Problems can originate from several sources. They include poor water quality caused by geologic (natural) conditions, refuse from human sources such as landfills, chemical contamination from agricultural activities, land use abuse, mineral exploration, mining, construction and accidental hazardous waste spills. Sediment and salt loading from severely eroding rangeland also contribute to poor water quality.

As more surface water is used for culinary purposes, the possibility of contamination will increase. The increase in population and outdoor recreation activities will also increase potential problems.

Increased development of groundwater will affect existing water quality. This is particularly true as withdrawals from Navajo sandstone aquifers are increased. Contamination will come from overlying and underlying formations as hydraulic gradients increase. The recharge areas for the Navajo sandstone aquifer have been mapped (See Figure 9-2 for areas in Washington County). The protection of this area by local entities is essential if reliable underground water resources quality and quantity are to maintained (Also see sections 12.5 and 12.6).

11.6 Municipal and Industrial Water Needs and Demands

Estimates of future population growth are used to project future culinary water needs.

TABLE 11-1
RATINGS OF PUBLIC COMMUNITY WATER SYSTEMS

Rating	Iron	Kane	Washington	Total
Approved	1	4	23	28
Not Approved	0	0	2	2
Corrective Action Required	0	1	4	5
Total	1	5	29	35

Population projections for the cities and towns in Washington, Kane and Iron counties were made by the State Office of Planning and Budget. Table 4-1 and Figure 4-1 show their projections. Most public water suppliers expect an increased demand in the next 20 to 30 years. Some of these increases are in the 40 to 60 percent range. Several suppliers expect an increase approaching 100 percent or nearly double the current use. This will require continued long-range planning and development.

Projected annual water use for cities and towns is shown in Table 11-2. The projected water use for the basin is based on the assumption conservation is applied and the per capita use is reduced one percent per year from 1995 until 2010, one-half percent per year until 2020 and one-fourth percent per year until 2040. This value will vary considerably from community to community.

Conservation of culinary water could be accomplished with installation of household water saving appliances such as low-flow fixtures and low-flush toilets. Xeriscaping and proper lawn watering could also reduce demands. See Section 17 for further discussion on water conservation issues.

These water use projections can be used to help determine when new water supplies will be needed to meet future culinary demands. All systems should be evaluated for their ability to meet the future culinary demands by four dimensions: source capacity, storage capacity, legal capacity and distribution system capacity. The water sources, physically and legally (water rights), must be able to meet the peak daily flow as well as the yearly flow volume.

Storage facilities must have sufficient capacity to meet indoor water demands, irrigation and fire flow. The water distribution system capacity must be adequate to meet demands at the point of use. Even if adequate water is available at the supply source and storage is sufficient to meet peak demands, the distribution system must be adequate.

11.7 Alternative Solutions

Future culinary water development will mainly revolve around providing water for the area's rapidly expanding population. The water development required to meet future needs will come by way of several sources. These include developing surface water and groundwater rights, operating existing reservoirs to produce the highest possible yield, building new reservoirs, converting agricultural water to municipal

TABLE 11-2
CURRENT AND PROJECTED CULINARY WATER DIVERSION

City	Year			
	1990	2000	2010	2020
	(acre-feet)			
Alton	20	22	27	30
Kanab	1,330	1,740	2,130	2,440
Glendale	50	60	70	80
Orderville	100	110	130	140
Kane Co. Unicorp	170	220	280	325
TOTAL (Kane Co.)	**1,670**	**2,152**	**2,637**	**3,015**
Kanarraville (Iron Co.)	90	100	110	125
Springdale	110	140	170	200
Rockville	40	50	65	75
Virgin	40	50	70	90
New Harmony	40	50	65	75
Toquerville	90	130	175	215
LaVerkin	490	800	1,110	1,340
Hurricane	1,600	2,380	2,990	3,500
Leeds	110	140	165	190
Washington	1,830	3,340	4,810	5,970
Hildale	230	350	490	610
St. George	11,910	18,470	24,440	28,940
Ivins	360	770	1,320	1,790
Santa Clara	820	1,370	1,840	2,200
Washington Co. Unicorp	900	1,210	1,500	1,750
TOTAL (Wash. Co.)	**18,570**	**29,250**	**39,210**	**46,945**
BASIN TOTAL	**20,330**	**31,502**	**41,957**	**50,085**

Note: Refer to Table 4-1 for population projections.

and industrial uses and conservation programs. Seeking modification of instream flow requirements also has possibilities.

Further development of the Navajo sandstone groundwater aquifer should be investigated. This is particularly true in the St. George area where considerable use is currently from groundwater. Potential development from this aquifer in the Kanab Creek drainage seems to have promise. Development of the Navajo sandstone groundwater aquifer should be carefully planned to prevent long-term mining (Also see Section 19).

Surface water will probably provide an increasing proportion of the culinary water supply. In order to use developed and undeveloped surface water efficiently, new storage facilities will be required. Several potential reservoir sites have been investigated; potential sites are discussed in Section 9.7.3.

All alternatives should be evaluated based on current and future conditions. This process is outlined in Section 3.2.1. ■

11.8 References

1. Clyde, Calvin G., *Groundwater Resources of the Virgin River Basin in Utah.* Utah Water Research Laboratory for the Utah Division of Water Resources, Salt Lake City, Utah, 1987.

2. Cordova, R.M. *Ground-Water Conditions in the Upper Virgin River and Kanab Creek Basins Area, Utah, with Emphasis on the Navajo Sandstone.* Technical Publication No. 70, Prepared by the U.S. Geological Survey in cooperation with the Utah Department of Natural Resources, Division of Water Rights, Salt Lake City, Utah, 1981.

3. Ibid, G.W. Sandberg, and Wilson McConkie. *Ground-water Conditions in the Central Virgin River Basin, Utah,* Technical Publication No. 40, Prepared by the U.S. Geological Survey in cooperation with the Utah Department of Natural Resources, Division of Water Rights, Salt Lake City, Utah, 1972.

4. U.S. Department of Agriculture, Soil Conservation Service and Utah Department of Natural Resources, Division of Water Resources, *Virgin River Basin - Utah Cooperative Study.* Salt Lake City, Utah, 1990.

5. Utah Division of Water Rights. *Water Use Data for Public Water Suppliers and Self-Supplied Industry in Utah.* Reports 1-8, Salt Lake City, Utah, 1960-1989 (also 1990-1991 unpublished).